All claims were rejected under 35 U.S.C. § 103(a) as being unpatentable over Muraishi (U.S. Patent 5,154,889) in view of Kitagawa et al. (U.S. Patent 4,629,862). That rejection is respectfully traversed and reconsideration is requested.

As discussed in the background of the application, prior systems for handling microscope slides, which have required heating of the slides, have generally introduced the slides into a heated environment which heated all slides to the same temperature. Another approach to heating microscope slides on a carousel was presented in U.S. Patent 5,645,114 which is assigned to the assignee of this application. In that system, the slides were supported on the carousel on individual heated areas. That feature has been claimed in a continuation to the '114 patent, Serial No. 09/205,945. That implementation permitted individual temperature control of slides, or sets of slides, to different temperatures. In an early implementation, each of those heaters was directly connected to a controller in a personal computer adjacent to the instrument.

The invention to which the original claims in this application are directed provides a solution to a problem which arises when the system of the '114 patent is designed to independently control temperatures to which a large number of microscope slides are heated. In one implementation, 48 slide heaters are independently regulated. In the prior approach, each heater would require two wires for supply of electrical current, and at least one additional wire was required for each temperature sensor. Therefore, for an implementation of 48 heaters, 144 wires would be required between the personal computer and the 48 heaters located on the rotating carousel. This large number of wires has such a large mass and stiffness that it prevents the rotary carousel from moving freely.

The solution presented by the present invention involves two levels of heat control. The instrument user specifies a desired temperature by typing that temperature into a user interface, a computer sitting on the desktop. That computer communicates to one or more controllers mounted on the moving platform. Accordingly, the user interface and host command functions on the desktop personal computer are split from the heater controller on the moving platform. The controller can communicate with the host software with fewer wires than would be required with individual control from the PC to each heater. The invention allows for the use of only a small number of wires in a connecting cable between a moving platform and a stationary base while still providing independent control of a large number of heaters to different temperatures.

On page 2, item 4 of the Office Action, the Examiner states that "Muraishi discloses an automatic device for incubating samples substantially as claimed. The device comprises a

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platform for supporting a plurality of samples, a plurality of *independent* [emphasis added] heaters 71 on the platform for providing heat to the samples..."

The claims are focused around the elements required to permit independent heating of microscope slides. The term "independent' in our context means that different samples can be heated independently to different temperatures. This limitation is now explicitly stated in each claim.

Muraishi does not disclose a means whereby different samples can be heated independently to different temperatures. The primary object of Muraishi's invention is to create an environment wherein the temperature is accurately maintained at a predetermined value (column 2, lines 33-35). The technical challenge that Muraishi faces is that temperature must be maintained in an incubation chamber despite the fact that openings in the chamber allow ambient temperature air to enter (column 3, lines 31-44). These openings are for spectrophotometric detection of color on the sample by a "read-out head" (column 2, lines 48-60). To solve this problem, the temperature-controlled incubator is housed within a larger, temperature-controlled chamber. This chamber has its own temperature control means and serves as a temperature buffer, minimizing large temperature swings during the reading of color, when the "read-out openings" are open (column 10, lines 19-43).

The plurality of heaters 71 to which the Examiner refers do not appear to be independent heating elements. In Figures 1 and 4, heater 71 appears as a heating block disposed above and below the sample. The plurality of heaters to which the Examiner refers appear to be heating positions, corresponding to different samples. Importantly, the positions do not have the capability of attaining distinct temperatures. The "plurality of heaters 71" have a single temperature sensor 72 (column 6, lines 36) that is positioned close to the housing compartment 21. This sensor provides temperature feedback to a first control circuit 73 which controls the temperature based on a "predetermined setting temperature T" (column 6, line 43). A single temperature control signal S2 controls all heaters 71 (column 6, lines 44-46). Therefore, the "plurality of heaters 71" are not independent in our context, i.e., attaining distinct temperatures for different samples.

The second heater 75 regulates air temperature in the larger chamber 70 and has its own temperature control circuitry. The temperatures attained by the first and second heaters are implied to be the same, since the stated purpose of the two-heater combination is to minimize

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temperature swings. Muraishi does not disclose, nor is it an aim to disclose, a means to heat different samples to different temperatures.

Further, Muraishi describes heaters in a fixed position, not mounted on a moving platform. The samples are pushed along the surface of a stationary heater 71.

Mounting independently-controlled heaters and their controllers on a moving platform (as applicants have done) is an important inventive step towards attaining two goals simultaneously:

1. independently heating many different samples to different temperatures;
2. indexing samples across a wide variety of reagents and buffer.

Although moving platforms (such as rotary carousels) are well known, heating of samples typically involves stationary heating chambers to which samples are brought. Muraishi falls into this category. Bringing samples to a fixed-location heater (as per Muraishi) precludes random access to add any reagent to any sample. Freedom to move both the samples and reagents allows greater flexibility and speed in executing the relevant chemistries on the samples.

To our knowledge, no one has previously developed a means for heating a large number of samples to different temperatures in a context that allows easy reagent addition and removal.

In addition, Muraishi's invention does not relate to microscope slides as is recited in all but claims 10 and 12. The "chemical analysis slides" 1 are a dry multi-layer film 1b disposed in a frame 1a with a circular hole. This "chemical analysis slide" is not suitable for the types of functions associated with microscope slides. Namely, the multi-layer films of this type are usually translucent, not optically transparent as microscope slides are. In addition, the "chemical analysis slide" is not suitable for mounting of cells or tissue sections. The aperture is too small to accommodate many tissue sections. In addition, the multilayer film is too flexible to create a single optical plane on which a microscopist can focus. Lastly, the film is not a suitable surface to which tissue sections can likely adhere.

Kitagawa et al. was cited as teaching an "incubator having a user interface 14 which is positioned off the platform and connected to the heater for controlling the temperature of the incubator (Figures 1 and 6)." Kitagawa et al. also does not disclose an independent heating means for a plurality if microscope slides. Kitagawa et al. discloses a heater observation chamber in a fixed stationary position on a microscope (the microscope slide platform) and a temperature controller not mounted on the platform. As with the disclosure of Muraishi, Kitagawa et al. also has a first and second heater. As before, one heater is contained within another, in order to achieve better temperature control of the sample. The heaters are not for heating different samples to different temperatures. Moreover, the platform is again a stationary

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platform. They do not disclose a means for solving the problem of regulating many different heaters on a moving platform.

Thus, none of the cited references, either individually or combined, teach a stationary user interface which communicates with a controller on a moving platform to provide temperature control of individual slides to different temperatures. Accordingly, claims 1-13 should be allowed.

From the above remarks, it is apparent that there is no suggestion in the prior art of heating microscope slides on a moving platform such that different slides are heated to different temperatures. New method claims 14-17 are directed to that broader aspect of the invention. Please note that the inventors of the new claims 14-17 are Steven A. Bogen and Herbert H. Loeffler, the same inventors as the '114 patent. John A. Purbrick, a coinventor of claims 1-13 is not a coinventor of claims 14-17.

CONCLUSION

In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned at (781) 861-6240.

Respectfully submitted,

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